

The present invention refers to a wall support for a thin TV set, screen and monitor. For language simplicity, in the following description said TV set, screen and monitor are referred to only as screen/s.

TV and computer sets are known which have thin screens, for instance liquid crystals or plasma screen. Said screens are made rest on a desired plane by means of a base allowing to orient the set both in the horizontal and vertical directions.

Said screens may also be fixed on a wall and in this case a support on purpose is required. A support is known comprising a first plate applicable to a vertical wall and a second plate articulated with the first plate capable of rotating in order to orient the screen only in the vertical direction, i.e, towards bottom or vice-versa. The rotation amplitude is controlled by two arms, each of them being fixed to both plates in order to prevent the rotation of said second plate over the desired amplitude.

The main disadvantage of the known support is that it does not allow orientation in the horizontal direction, i.e. towards right and left. Other disadvantages are that the known support is complicated as to the construction and consequently it is costly, which implies that it is sold to the consumers as a separate accessory.

In the following description it is presumed that the support is fixed to a vertical wall.

The invented support obviates said disadvantages; it comprises a first plate capable of being fixed to a wall (which plate will be referred to also as fixed plate in the following) and fixing means for a screen, mobile with respect to said first plate and connected with the latter and, as characterized in the claims, said first plate and said fixing means are spaced one from the other in order to let space for two horizontal arms placed spaced one over the other, the first arm being articulated by an end to said first plate and with the opposite free end to the fixing means for the screen and the second arm being articulated

with an end to said first plate and with the second free end to the fixing means for the screen, in opposite way with respect to the first arm, said arms being adapted to rotate and orient the screen horizontally, alternatively, about one or the other of two vertical rotation axis each passing by the articulation of the end of an arm on the first plate.

5 Said fixing means may be arranged alternatively :

- on a second plate articulated with the free ends of both said arms;
- on a third plate, over the second plate, which third plate may rotate under control towards bottom about a horizontal rotation axis adjacent to the lower edge of second plate to incline the screen;
- 10 -on a flat element to said second plate;
- on said arm free ends so as to allow screen rotations about a horizontal rotation axis; the fixing means being then blockable in the desired position.

Said fixing means fit connection means provided on the rear wall of the screen.

Rotations in the horizontal plane are those permitting to orient the screen to right and
15 left with respect to its position parallel with the wall, to which wall the support is fixed, and in the following they will be referred to as horizontal rotations. Rotations in the vertical plane are those permitting to orient the third plate and the screen associated with the latter towards bottom and in the following they will be referred to as vertical rotations.

The main advantage of the invented support is that the screen may be oriented both
20 horizontally, towards right and left, and vertically, towards bottom, the screen being caused always to be positioned in front of the viewer.

Other advantages of the invented support are that, thanks to the reduced thickness of the screen, the latter remains very close to the wall and that the simple construction reduces the cost sensibly so allowing to supply, if requested, said support together with
25 the screen and not separately, as an accessory.

The invented support will be described in more detail herebelow with reference to the drawings that represent only examples of embodiments and wherein the

- Figures 1 and 3 to 8 are perspective views and
- Fig. 2 is an exploded view.

5 Fig. 1 shows a support for a thin screen 1 in closed position which support comprises a fixed plate 2, fixable to a vertical wall through holes 3, a mobile plate 4 bearing holes 5 for fixing the screen (not visible in the figure), a first arm 6 and a second arm 7 contained between said two plates. First arm 6 is articulated with its right end to plate 2 and with its free left end to the mobile plate 4, on the contrary, the second arm 7 is articulated with its
10 right end to the mobile plate 4 and with its free left end to the fixed plate 2. Said articulations allow the mobile plate 4 to rotate alternatively towards left, about the rotation axis R1, according to arrow R1, and towards right, about the rotation axis R2, according to arrow R2 in order to orient horizontally the screen not shown in the figure.

Fig. 1 also shows articulation means 8, 9 and ribbings 10 for reinforcing the plates 2
15 and 4.

The articulation of the arms with the plates and, then, the working of the support will be explained in more detail with reference to Figures 2, 3 and 4.

Fig. 2 shows the same support illustrated in Fig. 1 and, in detail, how the arms 6, 7 are articulated on the plates 2 and 4. Two hole bearing tabs 8 in each articulation are
20 directly made by cuts in the plate surfaces and bent parpendicularly with respect to same plates.

Each tab couple is adapted to contain an arm end conveniently punctured in order to be articulated thereto by means of a pin 9 introduced into the holes 11 and 12 in the tabs 8 and in the arms and here blocked by rivetting. From the figure it is evident that the right
25 end of first arm 6 is articulated to the fixed plate 2 and the opposite free end is articulated

to the mobile plate 4, whereas, on the contrary, the left end of second arm 7 is articulated to fixed plate 2 and the opposite free end is articulated to the mobile plate 4 which bears holes 5.

Some parts described in the previous figures are not provided with reference numbers and are described in the following figures.

Figures 3 and 4 show the support 1 with the mobile plate 4 rotated with respect to the fixed plate 2, respectively, toward left about the rotation axis R1 according to arrow F1 and towards right about the rotation axis R2 according to arrow R2. From the figures it is realized that to move the mobile plate 4 from the position of Fig. 3 to the position of Fig. 4 it is necessary to reposition the mobile plate 4 parallel with fixed plate 2 by rotating it about axis R1 in the direction contrary to that indicated by arrow R1 and, from said position, rotate the mobile plate 4 about the rotation axis R2 according to arrow R2. The figures show that the mobile plate 4 is rotated alternatively by the first arm 6 and the second arm 7.

It will be realized that the screen (not shown in the figures) supported by the mobile plate 4 will be oriented according to such rotations and remain very close to the wall.

The articulation described in the figures prevents the mobile plate 4 from spacing from the fixed plate 2 when said mobile plate is parallel with said fixed plate, whereas the two different rotation axes R1, R2 allow the mobile plate 4 to be rotated alternatively in such a way that one of its two vertical edges is adjacent to the wall.

Fig. 5 shows a support for thin screen 20 comprising a fixed plate 21 with holes 22, a first mobile plate 23 and a second mobile plate 24 bearing holes 25 for fixing the screen. Plates 21 and 23 are articulated as the plates 2 and 3 of previous figures.

Mobile plate 23 bears, adjacent to the lower edge, two punctured side vertical tabs (not visible in the figure). Plate 24 bears, in correspondence with the holes in said tabs,

holes 26 for articulating with the mobile plate 23, by screws not visible in the figure which are introduced in said holes and engaging respective threaded inserts fixed to said tabs (also not visible in the figure) in order the mobile plate 24 rotate towards bottom about horizontal axis R3 in the direction of arrow R3.

5 Rotation of mobile plate 24 is limited by the contact of the latter with plate 23 during rotation of plate 24.

Fig. 6 shows a support for thin screen 40 completely similar with those shown in figure 5 wherein the second mobile plate 41 bears on its surface a plurality of horizontal apertures 42 to which two vertical bars 43 are fixed by means of bolts not shown in the
10 figure, said bars bearing a plurality of apertures 44 for fixing a screen. The combination of the horizontal apertures with those vertical makes it possible to fix to the support the majority of the screens put on the market.

In the embodiments shown in the figures 5 and 6 the support allows the screen to be oriented both to right and left and simultaneously towards bottom.

15 Fig. 7 shows a support for a thin screen 50 in closed position comprising a fixed plate 51, a mobile plate 52 that are reciprocally articulated as plates 2, 4, 21 and 23 of previous figures by means of a first arm 53 and a second arm 54. Mobile plate 52 bears an aperture 55 on its own surface for receiving a bent extension 56 (partly visible in the figure) of a flat element 57. Said flat element 57 is associated with plate 52 so as to control its vertical
20 slope by means of its own bent extension 56 engaging a corresponding curving in the surface 52 where, afterwards, said flat element is fixed by means of a screw and through holes present in said extension and in the surface of said plate 52, curving, holes and screws which are not visible in the figure. Flat element 57 is of the attack type "VESA" which is a normalized fixing means used by the most important screen producers to
25 realize the fixing means of the screens to the supports. Infact, said flat element 57 bears a

plurality of holes 58 positioned so as to be in correspondence with the holes provided in many screens on the market.

Fig. 8 shows a support for a thin screen 70 comprising a fixed plate 71, a first arm 72 and a second arm 73. First arm 72 is articulated with its right end to fixed plate 71 and with its opposite free end to the rear panel 74 of the screen 75, on the contrary second arm 73 is articulated with its left end to fixed plate 71 and with its opposite free end to the rear panel 74 of screen 75. Each free end of said first and second arm bears a punctured vertical bracket 76 which engages between two punctured vertical tabs 77 in the rear panel 74 of screen 75 and in said holes a bolt not visible in the figure passes that serves to fix the screen in the desired position. From the figure it is evident how the screen may be rotated, towards bottom or top, about horizontal axis R4 in the directions as indicated by the arrow F4.

It will be realized that the manual rotations as described in the figures may be caused mechanically by means of a suitable device controlled by a remote control.

Claims

1. Wall support (1, 20, 40, 50, 70) for a thin TV set, screen and monitor comprising a first plate (2, 21, 51, 71) adapted to be fixed to a wall and fixing means (5, 25, 42/44, 58, 76) for said TV set, screen and monitor which means are mobile with respect to said first plate and connected to the latter, characterized in that said first plate (2, 21, 51, 71) and said fixing means (5, 25, 42/44, 58, 76) are spaced one from another in order to let space for a first horizontal arm (6, 53, 72) and a second horizontal arm (7, 54, 73) placed spaced one over the other, the first arm being articulated by an end to said first plate and with the opposite free end to said TV set, screen and monitor and the second arm being articulated with an end to said first plate and with the opposite free end to said TV set, screen and monitor, in opposite way with respect to the first arm, said arms being adapted to rotate and orient said TV set, screen and monitor horizontally, alternatively, about one or the other of two vertical rotation axis each passing by the articulation of the end of an arm on the first plate.

2. Wall support (1) according to claim 1 characterized in that said fixing means (5) are in a second plate (4) articulated on the free end of said arms.

3. Wall support (20, 40) according to claims 1 and 2 characterized in that said fixing means (25, 42, 44) are on a third plate (24, 41) articulated adjacent to the lower arm of said second plate (23) in order to rotate under control about a horizontal rotation axis.

4. Wall support (50) according to claims 1 and 2 characterized in that said fixing means (58) are made on a flat element (57) rotatable and fixable to said second plate (52) where to they may be blocked.

5. Wall support (70) according to claim 1 characterized in that said fixing means (76) are provided each on a free end of said arms (72, 73) in order to rotate said TV set, screen and monitor about a horizontal rotation axis and to block them in the desired position.

AMENDED CLAIMS

[received by the International Bureau on 23 November 2004 (23.11.2004);
original claim 1 amended; remaining claims unchanged (1 page)]

+STATEMENT

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+STATEMENT

1. Wall support (1, 20, 40, 50, 70) for a thin TV set, screen and monitor comprising a first plate (2, 21, 51, 71) adapted to be fixed to a wall and fixing means (5, 25, 42/44, 58, 76) for said TV set, screen and monitor which means are mobile with respect to said first plate and connected to the latter, that said first plate (2, 21, 51, 71) and said fixing means (5, 25, 42/44, 58, 76) being spaced one from another in order to let space for a first horizontal arm (6, 53, 72) and a second horizontal arm (7, 54, 73) placed spaced one over the other, characterized in that the first arm is articulated with an end to said first plate and with the opposite free end to said TV set, screen and monitor and the second arm is articulated with an end to said first plate and with the opposite free end to said TV set, screen and monitor, in opposite arrangement with respect to the first arm, said arms being adapted to rotate and orient said TV set, screen and monitor horizontally, alternatively, about one or the other of two vertical rotation axis each passing by the articulation of the end of an arm on the first plate.
2. Wall support (1) according to claim 1 characterized in that said fixing means (5) are in a second plate (4) articulated on the free end of said arms.
3. Wall support (20, 40) according to claims 1 and 2 characterized in that said fixing means (25, 42, 44) are on a third plate (24, 41) articulated adjacent to the lower arm of said second plate (23) in order to rotate under control about a horizontal rotation axis.
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STATEMENT

Re Item V

- 1) Acknowledged
- 2) Acknowledged
- 2.1) Considering the correspondence between our claim 1 and the contents of point 2.1 as provided in this point of the Written Opinion, it is demed that a correspondence is valid partly, so that claim 1 is amended accordingly, the part which the applicant claims as new and inventive being the one placed after the term "characterized" in the new position..

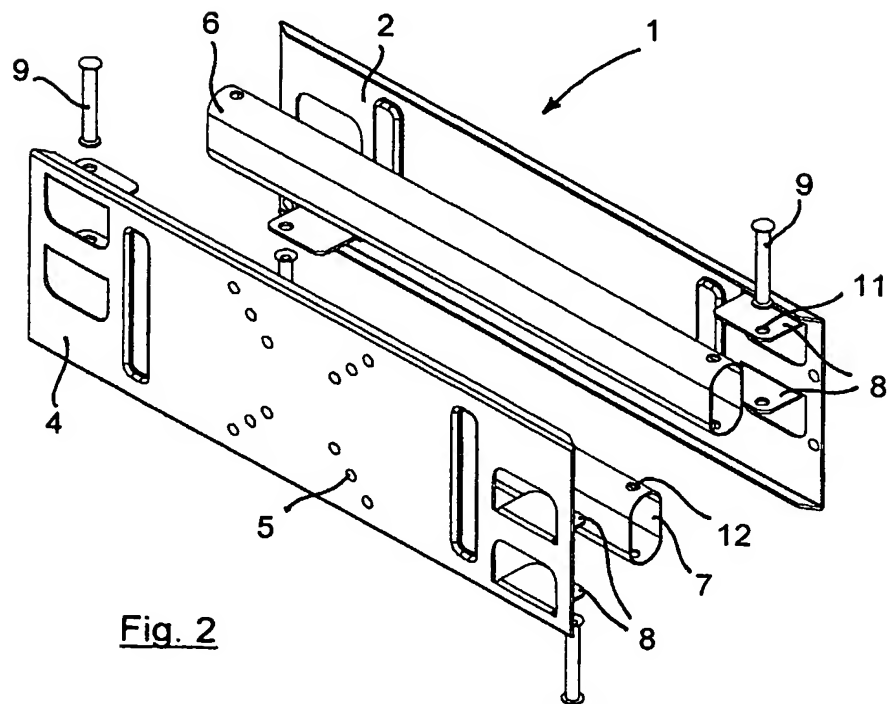
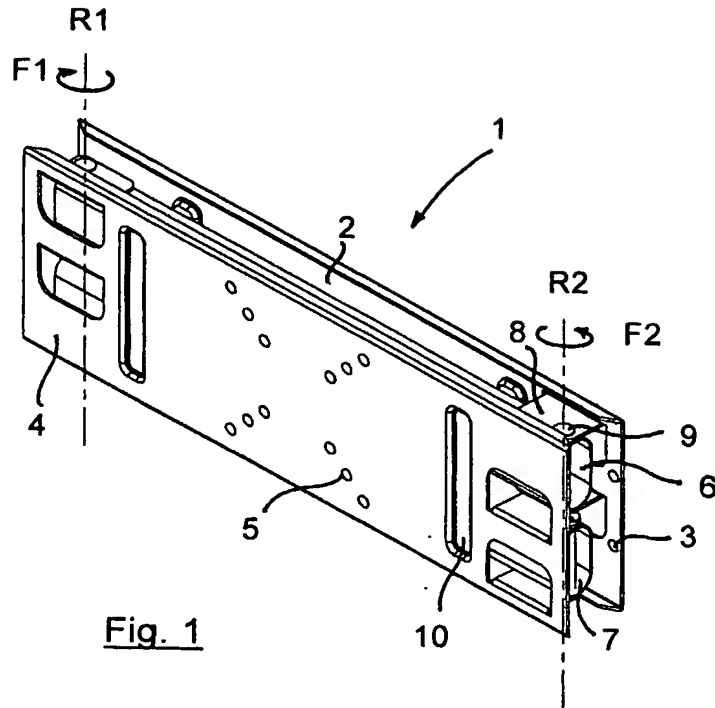
Concisely, the ground of our remark and amendment may be realized through the new characterizing portion which well shows the difference between the invention and the prior art, in particular the most important difference may be appreciated from our term "alternatively" (line 12 pag. 7) that explains how the arrangment of our arms ("opposite way" is replaced by "opposite arrangement") prevents the two arms from simoultaneously rotate , whilst in D1 the upper and bottom arms my rotate simoultaneously.
- 2.2) Opposing document D2 is objected since it discloses a lamp in which the arms are so arranged that it is only possible to orient the illuminating surfaces of the lamp/s about a horizontal axis and to impart to the lamp/s different heights with respect to the fixing point to a wall. Moreover, the lamp plane/s is prevented to rotate about a vertical axis, namely towards right and left.
- 2.3) Claims from 2 to 5 are mantained.

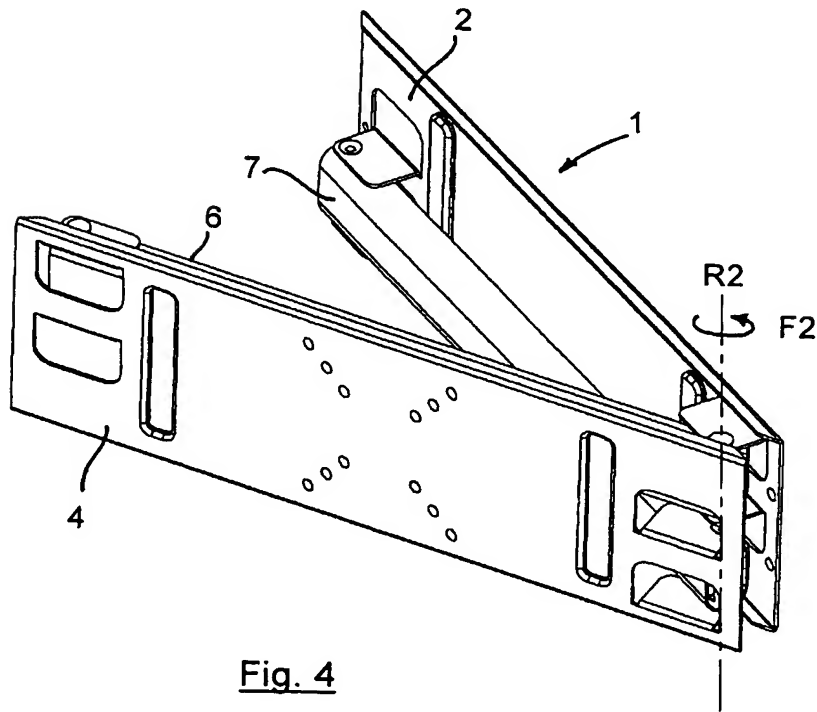
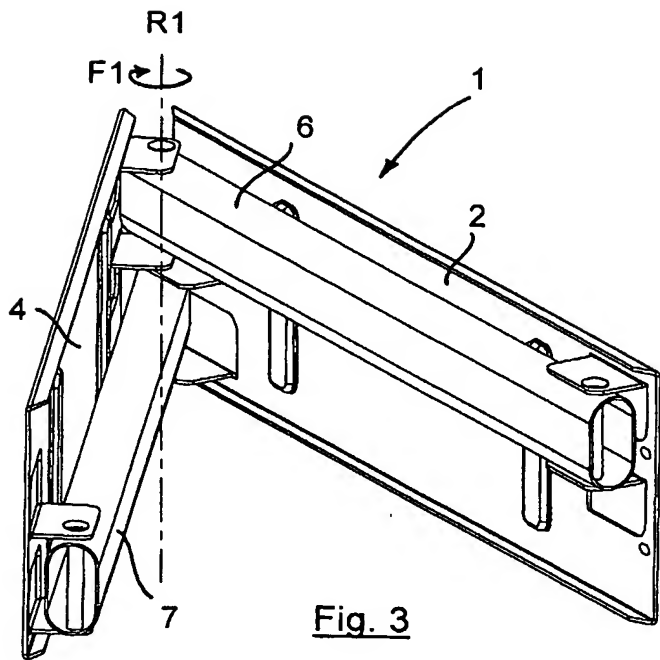
Re Item VII

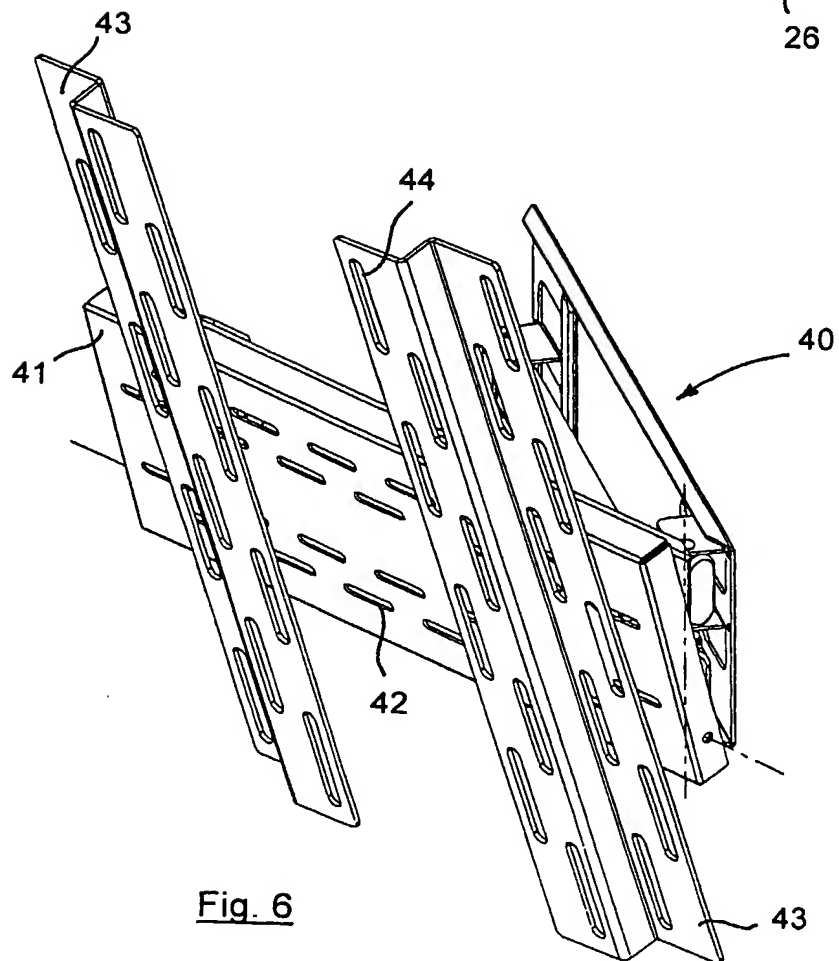
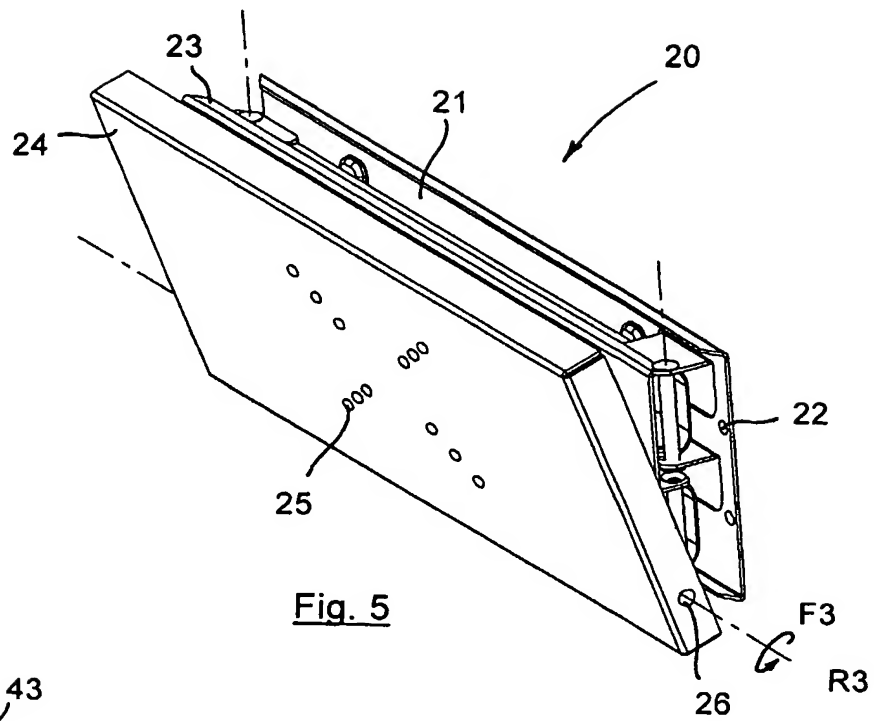
- 5) Documents D1 and D2 will be mentioned and briefly discussed when amending the descriuption during the International Preliminary Examination.

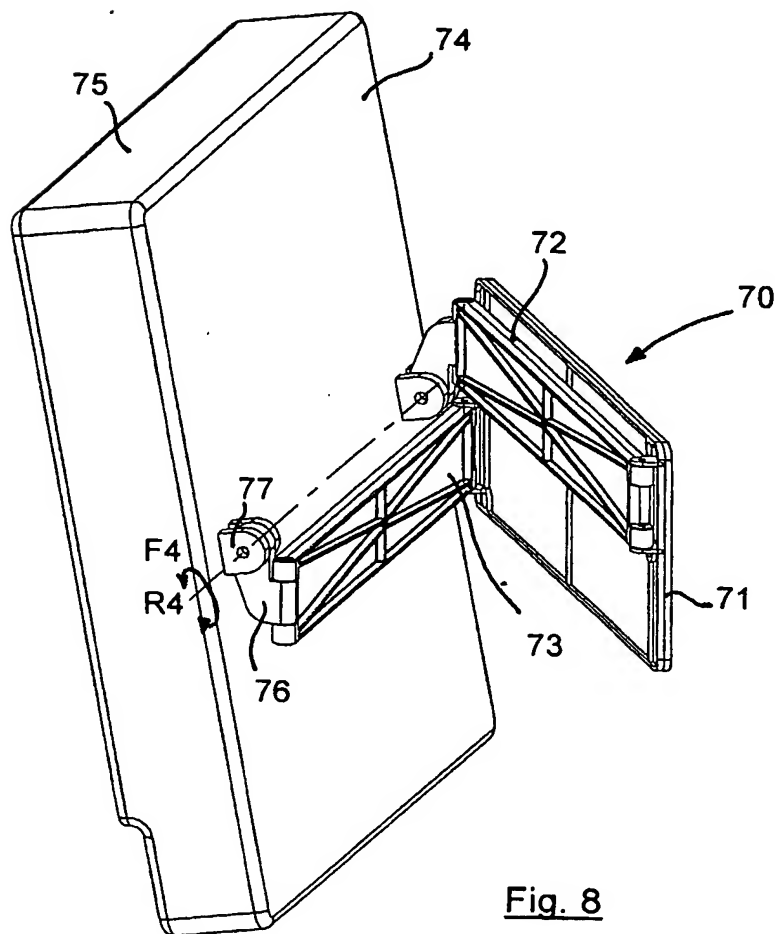
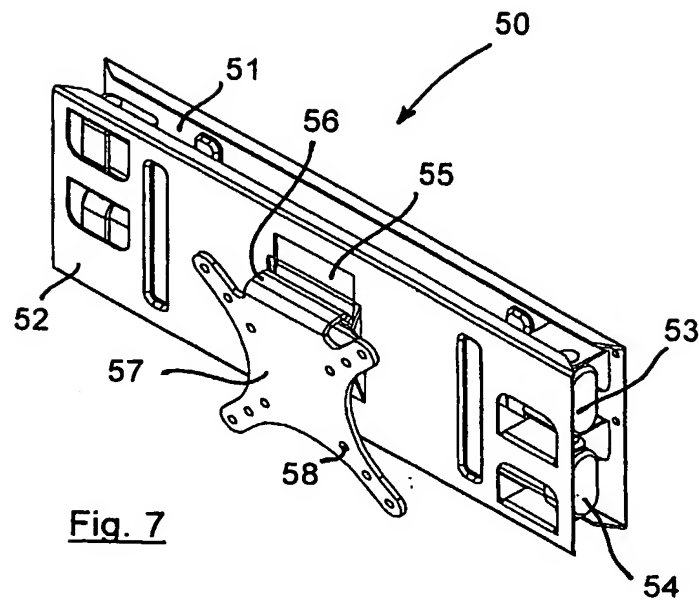
Re Item VIII

- 5) The term in "opposite way" in line 11, page 7, is replaced by "opposite arrangement", the meaning of this term being clear from the bottom part of claim 1 (lines from 12 to 14 pag. 7) and from figures 3 and 4.









INTERNATIONAL SEARCH REPORT

Inter: Application No
PC1/EP2004/006097

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 F16M13/02 F16M11/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 F16M A47G G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 102 348 A (O'NEILL EDWARD L) 15 August 2000 (2000-08-15) the whole document	1-5
X	DE 197 44 638 A (ZUMTOBEL STAFF GMBH & CO KG) 22 April 1999 (1999-04-22) figures 1,3,4 column 1, line 5 - line 14 column 2, line 43 - column 3, line 61	1
A	US 4 692 050 A (KAUFMAN YAACOV) 8 September 1987 (1987-09-08) figures 1,2,11	1,2
A	US 6 402 109 B1 (DITTMER JAY) 11 June 2002 (2002-06-11) the whole document	1
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
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- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

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- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- *G* document member of the same patent family

Date of the actual completion of the international search

21 September 2004

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INTERNATIONAL SEARCH REPORT

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>FR 2 606 614 A (DOUBLET DANIEL) 20 May 1988 (1988-05-20) the whole document</p> <p>-----</p>	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/EP2004/006097

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6102348	A	15-08-2000	NONE	
DE 19744638	A	22-04-1999	DE 19744638 A1 CH 693315 A5	22-04-1999 30-05-2003
US 4692050	A	08-09-1987	IL 73030 A DE 3533134 A1 GB 2164716 A ,B IT 1201981 B	31-07-1989 27-03-1986 26-03-1986 02-02-1989
US 6402109	B1	11-06-2002	NONE	
FR 2606614	A	20-05-1988	FR 2606614 A1	20-05-1988